CLAIMS

I/we claim:

1. An apparatus deployed within an indoor communications wireless distribution system located within an internal space of a structure, the apparatus comprising:

a radio base station or a repeater device comprising an external antenna and a bidirectional amplifier;

a central control unit for detecting and reducing interference within the indoor wireless network;

an at least one antenna attenuation control unit for controlling the attenuation of an at least one internally installed antenna device, the at least one antenna attenuation control unit is associated with the central control unit;

an at least one internally installed antenna device for receiving and transmitting via the indoor air interface signal, the at least one internally installed antenna device is associated with the at least one antenna attenuation control.

2 The apparatus of claim 1 wherein the repeater device is a bi-directional amplifier mini-repeater.

3. The apparatus of claim 1 wherein the at least one internally installed antenna device is a multi-band vertical polarization indoor omni-directional antennas.

4. The apparatus of claim 1 further comprising an at least one repeater attached to the at least one antenna attenuation control unit for enhancing the broadcast of the at least one internally installed antenna associated with the at least one antenna attenuation control unit.

5. The apparatus of claim 1 wherein the central control unit detects the source antenna of the interference by sampling at least one uplink signal for the detection of interference.

6. The apparatus of claim 1 wherein detecting is accomplished by commanding the at least one antenna attenuation control to attenuate the signal strength received from the associated antennas.

7. The apparatus of claim 1 wherein the central control unit reduces or eliminates the interference by re-sampling the at least one uplink signal so as to reduce the level of interference to a value below a pre-determined interference threshold.

8. The apparatus of claim 1 wherein the central control unit reduces or eliminates the interference by commanding the at least one antenna attenuation control to disconnect or lower the level of transmission of the associated at least one internally installed antenna device.

9. The apparatus of claim 1 wherein the central control unit identifies the blocking of the transmission frequencies or an interference signal that is not a wireless signal by sampling the signal by a coupler device without interfering with the transferred signal.

10. The apparatus of claim 1 wherein the central control unit samples the signal and identifies non-wireless signal generating interference.

11. The apparatus of claim 1 wherein the central control unit issuing at least one command signal to the at least one antenna attenuation control unit for disconnecting or attenuating the at least one internally installed antenna device.

12. The apparatus of claim 1 wherein the central control unit re-sampling the uplink signal for examining whether a detected interference is present or whether the strength of interference is above a pre-defined threshold.

13. The apparatus of claim 1 wherein the at least one antenna attenuation control unit further comprising:

a bias tee or a DC Inserter comprises a capacitor and choke for receiving a signal and associated at least one control command embedded in the signal from the central control unit through a signal

path and for further separating a power component from an RF component of the signal and feeding the power component to the power supply unit;

a coupler for sampling the RF component without attenuating the signal;

a band pass filter for attenuating the frequency range of the RF component while maintaining the frequency range of the at least one control command;

a decoder for decoding the at least one control commands and feeding the gain controller with the at least one control command;

a gain controller for controlling the operation of the RF attenuator, and;

an RF attenuator for feeding the RF component to the at least one internally installed antenna device.

14. The apparatus of claim 13 further comprising an RF switch for switching off and on the at least one internally installed antenna device.

15. The apparatus of claim 13 wherein the at least one decoded control command is fed to the RF switch for instructing the switch to switch on or off the antenna.

16. The apparatus of claim 13 wherein the RF attenuator responds to the gain controller output by attenuating the signal or by increasing the strength of the signal.

17. The apparatus of claim 13 wherein the RF attenuator feeds a variable strength signal back to the bias tee which in turn feeds the RF signal back to the central control unit for re-sampling by the central control unit for the detection of interference.

18. The apparatus of claim 13 further comprising a power supply unit for feeding power to the components of the at least one antenna attenuation control unit;

19. The apparatus of claim 1 wherein the central control unit further comprises:

a bias tee for inserting power into the signal transmitted to the at least one antenna attenuation control unit;

a high pass filter comprising a frequency selective circuit for blocking the transmission of at least one control command to the external antenna;

a coupler for sampling the signal without degrading the signal or attenuate the strength of the signal;

a splitter unit for transmitting the at least one control command to the at least one antenna attenuation control unit and wireless signal to a band pass filter;

a wireless band pass filter comprising a frequency selective circuit for filtering the wireless signal;

an interference detector for detecting of interferences;

an antenna attenuation control unit controller for receiving output from the interference detector and activating the at least one antenna attenuation control unit; and

a control band pass filter comprising a frequency selective circuit for passing the at least one control command to the splitter unit for combining the at least one control command with the wireless signal.

20. The apparatus of claim 19 further comprising a power supply fed by a power network and generating power for the operation of the central control unit and the at least one antenna attenuation control unit.

21. The apparatus of claim 19 wherein the antenna attenuation control unit controller is installed within the radio base station for detecting interference in relation to a plurality of antennas or repeaters.

22. The apparatus of claim 1 further comprises an interference detection unit for the detection of interferences in an uplink signal.

23. The apparatus of claim 22 wherein the interference detection unit comprises:

a at least one splitter unit for splitting an at least one signal into at least two similar signals;

an envelope detector for performing spectral analysis on the at least two similar signals and comparing the interference envelope with a predetermined wireless signal form;

at least one converter unit for converting the at least two similar signals from analogue to digital form.

a down converter unit for converting the at least two similar signals into an intermediate frequency,

a digital signal processor for processing the at least two similar signals in analog form,

a central processor unit for processing the at least two similar signals in digital form and for sending an at least one control command to control the attenuation of the at least one internally installed antenna device.

24. The apparatus of claim 22 further comprising an intermediate frequency surface acoustic wave filter unit to spectral energy of a noise signal in a specific frequency band; at least one band width intermediate frequency band pass filter; and a multiplexer unit.

25. The apparatus of claim 1 wherein the central processor unit recognizes an interference element in the uplink signal by examining the strength of the signal relative to a pre-determined interference threshold.

26. The apparatus of claim 1 wherein the at least one converter is an analog-to-digital converter.

27. The apparatus of claim 1 wherein the central processor unit recognizes an interference element in the uplink signal by examining the stability of the signal or the signal strength along a time axis.

28. The apparatus of claim 1 wherein the central processor unit recognizes an interference element in the uplink signal by examining the spectral structure identified by the examination of the interference envelope at the extremities of the signal and the comparison of the detected envelope to the known structure of wireless signal.

29. The apparatus of claim 1 wherein the central processor unit recognizes an interference element in the uplink signal by examining the power level of the signal across pre-defined time slots and the time slot intervals.

30. The apparatus of claim 1 wherein the central processor unit recognizes an interference element in the uplink signal by examining the correlator of the base sequence of the control channel of the site.

31. The apparatus of claim 1 wherein the central processor unit recognizes an interference element in the uplink signal by examining statistics of uplink levels of at least one previously made transmission, compared to actual uplink levels for detecting readings outside the base level determined over the time.

32. The apparatus of claim 1 wherein the central processor unit recognizes an interference element in the uplink signal by examining the length of time between the start and ending of each interference signal detected.

33. The apparatus of claim 1 wherein the at least one control command provides for the switching off or on of the at least one internally installed antenna device.

34. A method for the detection of an interference in the uplink wireless signal of an indoor communications wireless distribution system, the method comprising the steps of:

determining the presence of interference in the wireless signal received from a set of antennas located within the indoor wireless network;

determining whether an interference element is present in the wireless signal;

selecting a first antenna from the set of antennas located within the indoor wireless network; and

attenuating the signal strength of the first antenna by an attenuation value.

35. The method of claim 34 further comprising the step of determining whether the attenuation of the signal strength from the first antenna was reduced by the attenuation value.

36. The method of claim 34 further comprising the steps of:

selecting a second antenna from the set of antennas located within the indoor wireless network;

attenuating the signal strength of the second antenna by an attenuation value;

determining whether the attenuation of the signal strength from the second antenna was reduced by the attenuation value.

37. The method of claim 34 further comprising the step of attenuating the first or the second antenna until the interference falls below a pre-determined threshold.

38. The method of claim 34 further comprising the step of switching off the first or second antenna to prevent the interference from extending across the indoor network.

39 The method of claim 34 wherein the first or the second antenna is an at least two antennas.

40. The method of claim 34 wherein the signal strengths received is attenuated by increasing or decreasing the first or second antenna signal strength by about 5-25 dB.

41. The method of claim 34 wherein the first or second antenna is the entire set of antennas constituting the indoor network.

42 The method of claim 34 further comprising the step of disconnecting all the antennas of an indoor wireless network.

43 The method of claim 34 wherein the step of attenuating the first or the second antenna includes the step of increasing or decreasing the antenna's signal strength.

44.The method of claim 34 further comprising the step of determining whether following the attenuation of the signal strength from the first or the second antenna the interference appears within the signal.

45. The method of claim 34 further comprising the step of repeatedly increasing the first or second antenna signal strength until the interference is detected or until a predetermined signal strength threshold is achieved.

46. The method of claim 34 further comprising the step of reconnecting the switched off antennas or restoring a predetermined signal strength to the first or second antenna where the interference diminishes.